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Lauxaniidae (Diptera) of North Korea Part 2

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Abstract Five new species, *Minettia kimi*, *M. linguifera* and *M. tarsata*, and *Calliopum acrostichalis* and *C. dolabrilforme*, are described; three species of *Minettia* are recorded from North Korea for the first time.

Key words: Diptera; Lauxaniidae; new species; new records; North Korea.

16. *Minettia (Frendelia) longipennis* (FABRICIUS)

Musca longipennis FABRICIUS, 1794, 323.

Minettia (Frendelia) longipennis: COLLIN, 1948, 228.

This blackish species is unique in the presence of a pair of rounded swellings on the ventrolateral sides of face and fuscous base on the clear wing. Male and female terminalia: see REMM and ELBERG, 1979, fig. 14.

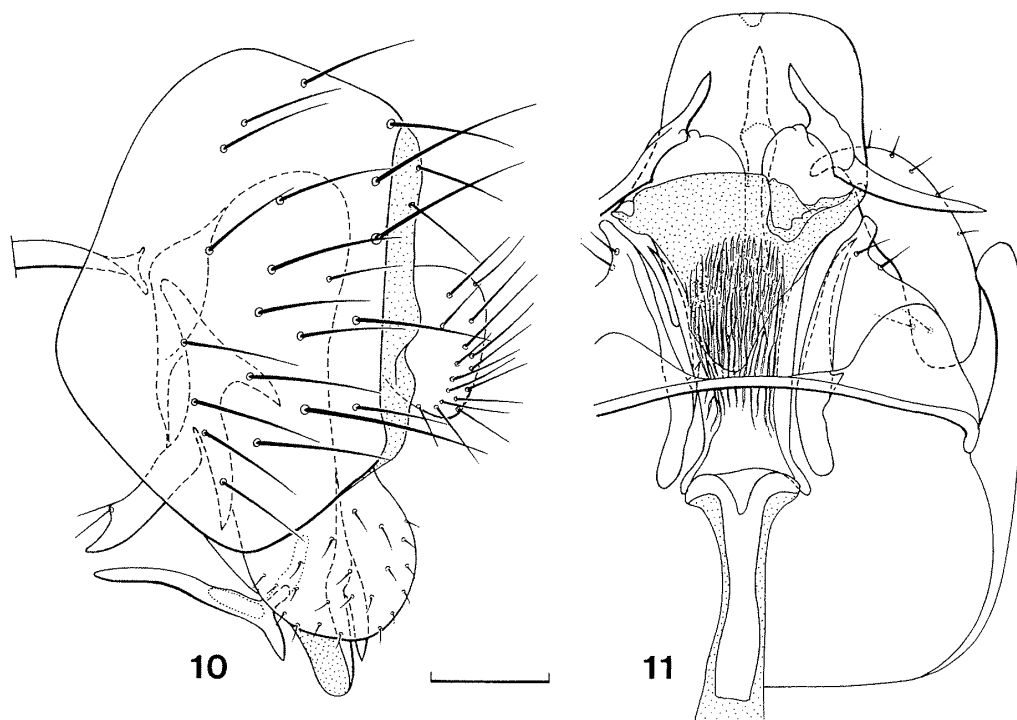
Specimens examined. 1♂6♀, Ryongaksan Mts., 10 km W of Pyongyang, 9 & 14.V.1988; 1♂2♀, Okryu Valley, Kumgangsan Mts., 18 & 21.V.1988; 2♀, Wonsan Botanical Garden, 28.V.1988; 1♂, Suyangsan Mts., 10 km NW of Haeju, 29.VII.1989; 2♂5♀, 10 km NW of Pyongyang, 1.VIII.1989; 1♂, Tokkol Valley, Myohyangsan Mts., 3.VIII. 1989; 7♂12♀, Myohyangsan Mts., 5 km SW of Hyangsan, 4.VIII. 1989.

Distribution. Europe, Russia, China (Mongolia, Taiwan), N. Korea, Japan. New to North Korea.

17. *Minettia (Minettia) kimi* SASAKAWA and KOZÁNEK, n. sp.

(Figs. 10–11)

Female. Head testaceous yellow, but ocellar triangle, parafrontalia, occiput and dorsal half of postorbit black and densely grey pollinose; face and gena sparsely pollinose; antenna and palpus orange to testaceous, 1st and 2nd antennal segments brownish black, arista brown; face with a black, large and



Figs. 10–11. Male genitalia of *Minettia* (*M.*) *kimi* n. sp. — 10, epandrium and surstylus, lateral view; 11, hypandrium, postgonite and aedeagus, ventral view. Scale 0.1 mm.

round spot at middle above ventral margin. Thorax black, densely grey dusted; mesonotum with an obscure pair of brownish stripes just mesad of *dc*-lines; abdominal tergites blackish brown, sparsely grey dusted, T3(2)–5 each with testaceous yellow posterior margin, T6 yellow and with brown median spot and anterolateral bands, T7 entirely yellow; S4 and 5 largely testaceous yellow, brown at middle; S6–7 and ovipositor entirely testaceous yellow. Wing very faintly tinged with brown; calypter with fringe brownish white; halter yellow. Legs yellowish to pale brown except for mid and hind coxae, and hind femur dark brown; all knees yellow.

Frons distinctly wider than long, nearly twice as wide as eye, with many inclinate setulae on ventral 1/2; upper *or* longer than the lower which is subequal to *oc*; orbital setulae between both *or* reclinate; *oc* at middle between anterior and posterior ocelli, and just inside of inner edge of posterior ocellus; face flat, antennal grooves very shallow; gena about 1/4 height of eye; 3rd antennal segment twice as long as wide, gradually narrowing apically; arista about 1.6 times as long as whole length of antenna, microscopically pubescent.

Mesonotum with 0+3 *dc*, distance between anterior two *dc* shorter than that between transverse suture and 1st *dc*; 1st *dc* slightly shorter than *prsc*; 6 dense rows of *acr*; 4–5 dense rows of *ia*-setulae before *ia* which is subequal to

1st *dc* in length. Wing 3.7–4.1 mm (4.0 in holotype) in length; costal sections in proportion of 45–50 : 13–15 : 10; r-m slightly beyond middle of discal cell; ultimate section of M_{1+2} 1.7–2.1 times as long as penultimate; ultimate section of M_{3+4} 1/5–1/7 of penultimate. Fore femur with 6–7 *pd*, 4–5 *pl* and 5–6 *pv*; mid tibia with 1 spur.

S4–6 each rectangular, subequale to each other in size; S7–9 each distinctly wider than long and setose on distal 1/2; S9 twice as wide as S5; spermathecae orbicular, with necks brown, 130 μ m and 85 or 90 μ m in diameter.

Male. Differs from female in the following points: ocellar triangle and ventral 1/2 of occiput pale brown; parafrontalia faintly brown tinged around base of lower *or*; T5 with brown median spot and broad anterolateral bands; protandrium testaceous yellow; epandrium with a small brown spot at middle of anterodorsal part; legs almost entirely testaceous; wing length 3.5 mm.

Protandrium as long as epandrium in dorsal side, without median ventral part. Epandrium broadened ventrally, sparsely setose; surstylus separated from epandrium, large, with ventral tip strongly incurved, sparsely setulose on lateral side; hypandrium weakly sclerotized, very narrow bar-like except for both lobate lateral ends; postgonite trifurcate, each process ending in a black and pointed apex; aedeagus membranous but weakly sclerotized in dorsal and lateral sides, with a black spinous process on dorsal side, a pair of bifurcate processes on distal part of ventral membranous part which is striated at middle, and minute spinulae on dorsal side of distal striated part; aedeagal apodeme about 1/2 length of aedeagus.

Holotype female, Ryongaksan Mts., 10 km W of Pyongyang, 9.V.1988, M. KOZÁNEK. Paratypes: 1♂4♀, same locality as holotype, 9 & 14.V.1988; 1♀, Tokkol Valley, Myohyangsan Mts., 13.V.1988.

Distribution. North Korea.

Remarks. This species belongs to the *loewi*-group (D' group of STUCKENBERG, 1971) in having the long ocellar triangle and furcate postgonite (REMM and ELBERG, 1979, fig. 13). It is characterized by the coloration of head and abdomen, and structure of aedeagus. Also, it is distinguishable from Russian *gemmata* SHATALKIN by its bicolor abdomen and legs, and large size.

This species is named after Dr. KIM Chang Il, Zoological Institute, Pyongyang.

18. *Minettia (Minettia) linguifera* SASAKAWA and KOZÁNEK, n. sp.

(Figs. 12–13)

Female. Brownish black; frons mat, with ventral margin narrowly yellowish; ocellar triangle and parafrontalia densely dusted; parafacialia brown, with dark brown triangle between base of antenna and eye; face and parafacia-

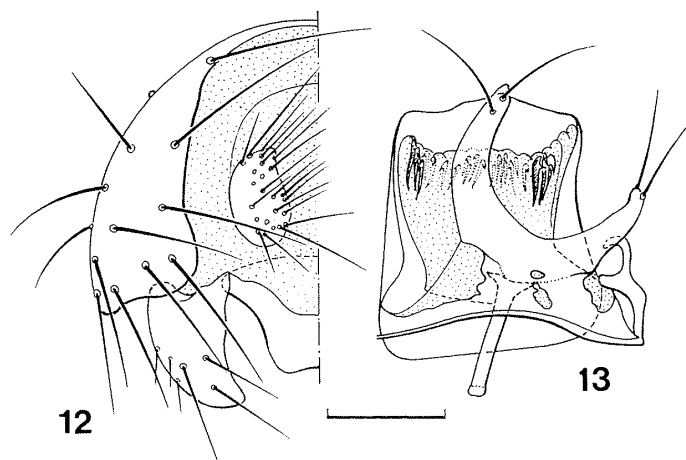
lia distinctly greyish pruinose; antenna brown, 3rd segment distinctly darkened excepting base; palpus brownish black. Thorax and abdomen brownish black; thoracic pleura brown tinged, densely grey dusted; mesonotum with 2 pairs of brownish stripes which are obscure at both anterior and posterior ends, each situated between 2 outer rows of *acr* and 2 inner rows of *ia*-setulae. Wing very faintly yellowish tinged; calypter with fringe testaceous; halter yellow. Legs dark brown, bases of all tibiae and tarsi entirely yellowish.

Frons wider than long, 1.6 times as wide as eye; lower *or* slightly shorter than upper *or*; orbital setulae distinct, in a sparse row; *oc* longer than upper *or*; face flat or weakly concave; gena 1/6 height of eye; 3rd antennal segment 1.5 times as long as wide; arista 1.7 times as long as whole length of antenna, pubescent, with longest hair 1/4 width of 3rd segment.

Mesonotum with 0+3 *dc*, 1st *dc* about 1/2 of the 2nd; *acr* in 6 rows; 4 rows of setulae before *ia*. Wing 3.4–3.5 (holotype) mm in length; costal sections in proportion of 45–50 : 12 : 10; r-m before middle of discal cell; ultimate section of M_{1+2} subequal to or slightly longer than penultimate; ultimate section of M_{3+4} 1/10 of penultimate. Fore femur with 5–6 *pd* and 4–5 *pv*; mid femur with a distal row of 4–6 *al*; mid tibia with 1 spur.

T3 with marginal setae extremely long (about 1.5 times as long as those on T4 and about 2.5 times those on T5).

Male. Similar to female, but wing length 3.3 mm; marginal setae on T3 slightly longer than those on other tergites; S6 as long as wide, 1.3 times as long as S5; 2–3 posterolateral setae on S5–6 distinctly longer than others. Protandrium annular, almost as long as epandrium in dorsal side but ventral part very narrow and almost horizontal, bearing a short seta just below spiracle. Epandrium broadened ventrally, with long setae sparsely; surstylus subtriangular, with 3 long setae on posteroventral part; hypandrium narrow; postgonites united



Figs. 12–13. Male genitalia of *Minettia* (*M.*) *linguifera* n. sp. — 12, caudal view, left half; see Fig. 11. Scale 0.1 mm.

with each other at base, with 2 long setae on each blunt tip; aedeagus weakly sclerotized dorsally and membranous ventrally, with many crochet needle-like processes on inner posterior membrane; aedeagal apodeme shorter than postgonite.

Holotype female, Ryongaksan Mts., 10 km W of Pyongyang, 14.V.1988, M. KOZÁNEK. Paratype: 1♂1♀, same data as holotype.

Distribution. North Korea.

Remarks. The male terminalia are unusual in the presence of a tongue-like ventral lobe which is connected laterally with posterobasal angles of surstyli. The aedeagus and postgonite of *linguifera* show the similarity to those of European *fasciata* (FÄLLEN) (REMM and ELBERG, 1979, fig. 11), but the apical structure of postgonite is quite different from each other. Also, this species is similar to European *pallida* (MEIGEN) in the coloration of mesonotum and presence of short hairs on the arista, and to *longisteta* LOEW in the presence of long marginal setae on the female 3rd abdominal tergite, but differs distinctly from them in the coloration of abdomen and legs.

19. *Minettia (Minettia) lupulina* (FABRICIUS)

Musca lupulina FABRICIUS, 1787, 344.

Minettia lupulina: CZERNY, 1932, 26.

Specimens examined. 1♂4♀, Myohyangsan Mts., 3 & 4.VIII.1989.

Distribution. Europe, Russia, N. Korea, Japan; U.S.A. New to North Korea.

20. *Minettia (Minettia) nigriventris* (CZERNY)

Prorhaphochaeta nigriventris CZERNY, 1932, 31.

Minettia nigriventris: STUCKENBERG, 1971, 552.

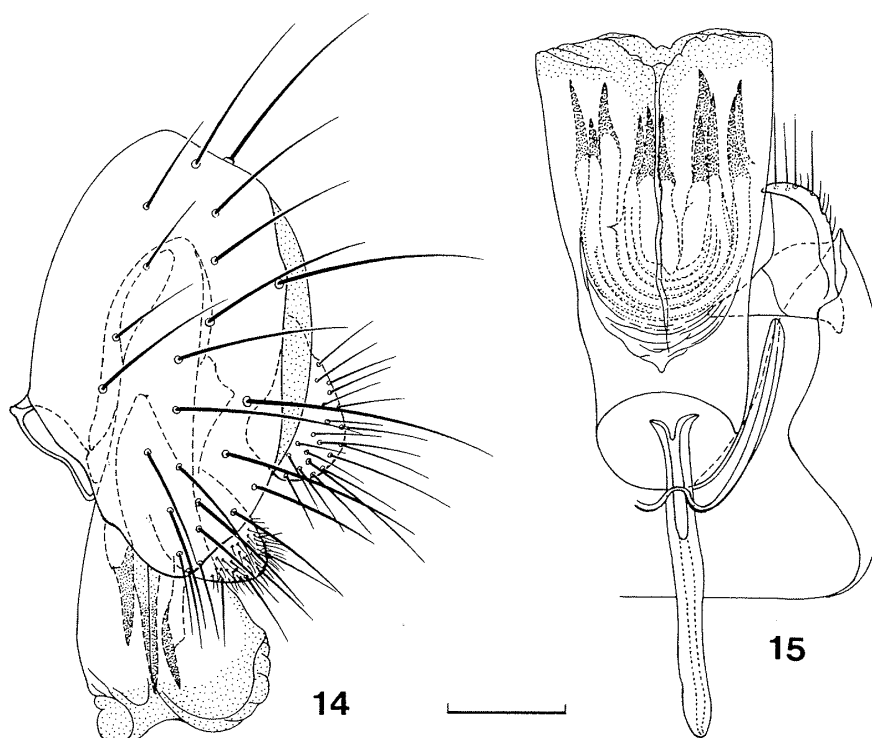
Specimens examined. 1♂4♀, Ryongaksan Mts., 10 km W of Pyongyang, 14 & 16.V.1988; 1♂5♀, Okryu Valley, Kumgangsan Mts., 19 & 21.V.1988; 2♂, Manmulsang, Kumgangsan Mts., 24–25.V.1988.

Distribution. Russia (Ussuri), N. Korea, Japan. New to North Korea.

21. *Minettia (Minettia) tarsata* SASAKAWA and KOZÁNEK, n. sp.

(Figs. 14–15)

Male. Head brown, parafrontalia and ocellar triangle more or less darkened; frons and face sparsely grey dusted, parafacialia distinctly grey-



Figs. 14–15. Male genitalia of *Minettia* (*M.*) *tarsata* n. sp. — See Figs. 10–11. Scale 0.1 mm.

whitish pruinose; frons testaceous yellow along ventral margin ($1/8$ length of frons); face more or less darkened along ventral and ventrolateral margins; parafacialia testaceous dorsally, with a brown triangular spot laterad of antennal base; antenna yellowish to pale brown, arista brown excepting base; palpus dark brown to brownish black. Thorax blackish brown except for pale humerus, lateral sides of mesonotum and pleurotergite, densely grey dusted; mesonotum and scutellum mat, bluish grey when viewed from behind. Wing tinged with yellowish brown; calypter with fringe pale brown; halter yellow. Legs blackish brown, but hind coxa and all trochanters pale, base of tibiae narrowly yellow, tarsi yellow excepting distal segments testaceous. Abdomen pale brown but testaceous on T1–2 or 3, or sometimes entirely testaceous.

Frons a little wider than long, nearly 1.3 times as wide as eye; lower *or* slightly shorter than the upper; orbital setulae minute; *oc* slightly longer than upper *or*; gena $1/8$ height of eye; face flat except for carina only between antennal bases; 3rd antennal segment about twice as long as wide, with pile whitish; arista about twice as long as whole length of antenna, with longest hair $3/5$ – $4/5$ as long as width of 3rd segment.

Mesonotum with $0+3$ *dc*, 6 rows of *acr* which are all equal in length, and distinct *ia*. Wing 3.8–4.1 mm (3.9 in holotype) in length; costal sections in proportion of 52–55 : 13–15 : 10; r–m almost at middle of discal cell; ultimate-

section of M_{1+2} nearly twice as long as penultimate; ultimate section of M_{3+4} $1/4-1/5$ of penultimate. Fore femur with 3–4 long *pv*; mid tibia with 1 spur; metatarsus of hind leg flattened, almost as wide as tibia at middle of lateral side.

Protandrium annular but almost horizontal in ventral side, distinctly narrowed ventrad of spiracles; S5 1.5 times as wide as long, S6 almost as wide as long. Epandrium sparsely setose; surstylus separated from epandrium, with ventral tip incurved, bearing long setae; hypandrium V-shaped, but with incision at median base; postgonite absent; aedeagus broad tubulate, not separated completely on ventral side, well sclerotized excepting distal membranous part, with about 11 internal processes which are long and pointed on tips; aedeagal apodeme slightly shorter than aedeagus.

Female. Similar to male; wing length 3.5–4.0 mm.

Holotype male, Myohyangsan Mts., 5 km SW of Hyangsan, 4.VIII.1989, M. KOZÁNEK. Paratypes: 3♂2♀, same data as holotype.

Distribution. North Korea.

Remarks. This species is unique in having the flat metatarsus of hind leg. It differs from European *longiseta* (LOEW) and Japanese *divaricata* SASAKAWA by the presence of short acrostichals.

22. *Calliopum acrostichalis* SASAKAWA and KOZÁNEK, n. sp.

Male. Head with frontalia shiny brown, distinctly pale on ventral $1/4$; parafrontalia, ocellar triangle, vertex and dorsal $1/2$ of back brownish black; parafrontalia brilliantly shinning; face subshiny brown, dusted with silvery white; parafacialia testaceous, silvery white dusted except for shiny triangular area laterad of antenna; gena and postgena pale brown; antenna including arista pale brown, 3rd segment distinctly darkened except for base; palpus brownish black; proboscis dark brown. Thorax black; mesonotum and scutellum weakly shining, densely brownish grey dusted; pleura bluish grey dusted. Wing very faintly tinged with yellow; calypter with fringe pale brown; halter yellow. Legs brown; knee and basal $2/3$ of metatarsus of fore leg yellow; tibiae and 1st–2nd tarsal segments of mid and hind legs yellow, but distal $1/4-1/5$ of tibiae brown, and distal segments of tarsi pale to yellowish brown. Abdomen shiny black.

Frons slightly wider than long, parallel-sided, 1.8 times as wide as eye; parafrontalia 1.3 times width of frontalia at middle; lower *or* $2/3$ length of the upper; *oc* slightly longer than lower *or*, divergent; orbital and frontal setulae below level of lower *or* minute and sparse; face weakly protruded between and just below bases of antennae; eye as high as broad; gena $1/5$ height of eye; antenna with 1st segment as long as 2nd, 3rd segment nearly thrice as long as

wide, gradually narrowing apically, 2.4 times length of basal 2 segments together, with pile white; arista about twice length of 3rd segment, pubescent microscopically.

Mesonotum with $0+3\ dc$, 1st *dc* nearly $1/2$ length of the 2nd, 3rd *dc* about twice length of the 2nd; *acr* in 2 rows, 2–3 posterior pairs distinctly longer than presutural ones, and posteriormost one $2/3$ length of *prsc*; *ia* subequal to 1st *dc* in length; mesopleuron with a seta at middle above ventral margin; *stpl* 1. Wing 4 mm in length; costal sections in proportion of $67:15:10$; r-m a little beyond middle of discal cell; ultimate section of M_{1+2} twice length of penultimate; ultimate section of M_{3+4} $2/9$ of penultimate. Fore femur without ctenidium; *pd* in all tibiae, hind tibial *pd* weaker than others; mid tibial spur 1.

Holotype male, Myohyangsan Mts., 5 km SW of Hyangsan, 4.VIII.1989, M. KOZÁNEK.

Distribution. North Korea.

Remarks. This species is unique in having the intra-alar setae and two rows of long postsutural acrostichal setae in addition to the prescutellar setae, thus differing from all the known species.

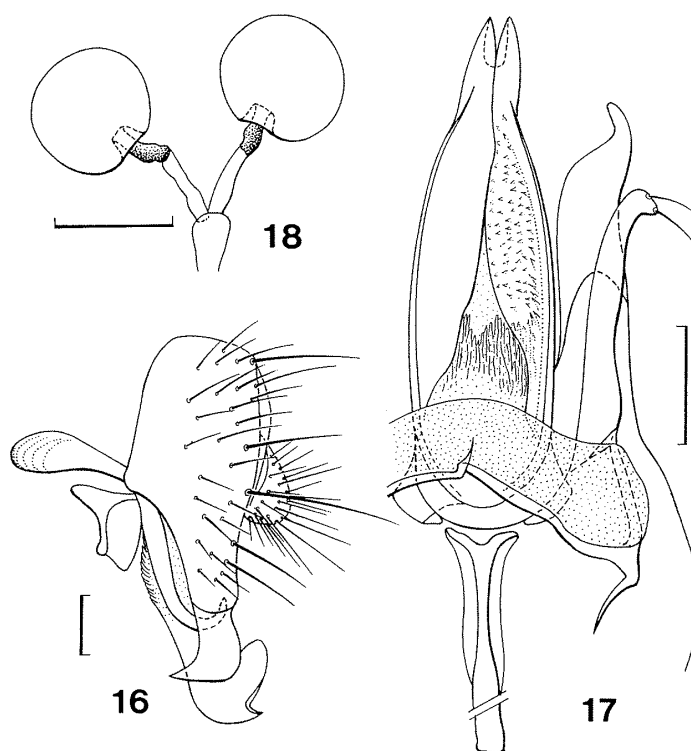
23. *Calliopum dolabriforme* SASAKAWA and KOZÁNEK, n. sp.

(Figs. 16–18)

Male. This species differs distinctly from *acrostichalis* n. sp. in the following points: head brownish black, but frons testaceous to pale brown on ventral $1/5$ – $1/6$; parafrontalia more darkened; antenna brown, but 2nd segment, base of 3rd segment and base of arista more or less pale, testaceous brown; thorax and abdomen shining black; mesonotum and scutellum slightly, and pleura densely dusted with brownish grey; legs with coxae and femora brownish black, tibiae brown and with basal knee parts distinctly yellow (narrowly in fore kne), fore tarsus brown, mid and hind tarsi yellow.

Frons 1.3–1.5 times as wide as eye; parafrontalia about $2/3$ width of frontalia; *oc* subequal to upper *or*; face weakly carinate between bases of antennae; gena $1/6$ – $1/7$ height of eye; antenna with 1st segment slightly shorter than the 2nd, 3rd segment 1.8 times as long as wide; arista 2–2.5 times as long as 3rd segment, short-haired, with longest hair nearly $1/3$ as long as width of 3rd segment.

Mesonotum usually with $0+2\ dc$ (rarely $0+3\ dc$, anteriormost *dc* $1/2$ of the 2nd), anterior *dc* $2/3$ of the posterior; *acr* in 4 (rarely 6) rows before level of anterior *dc*, a pair just behind level of anterior *dc* long and about $2/3$ length of *prsc*; *ia* about $2/5$ of posterior *dc*; *stpl* 1, rarely accompanying by a short seta before that. Wing 3.6 (holotype)–4.1 mm in length; costal sections as 53 – $62:14$ – $16:10$, r-m at middle of discal cell.



Figs. 16–18. Male genitalia (16–17) and spermathecae (18) of *Calliopum dolabriforme* n. sp. — See Figs. 10–11. Scale 0.1 mm.

Protandrium annular, as long as epandrium in dorsal side, with ventral part weakly sclerotized and almost horizontal in caudal view. Epandrium narrowed ventrally, ending in ax-form surstylus; hypandrium somewhat V-shaped, weakly sclerotized except for basal margin; praegonite long, curved dorsally at end, bearing 2 setae on tip; aedeagus nearly 1.5 times as long as apodeme, bifurcate before apex, wrinkled longitudinally at ventral base and densely spinulose on inner ventral side.

Female. S8 constricted on posterolateral 1/3 and emarginated on posterior 1/5; S9 rectangular, thrice as wide as long; spermathecae orbicular, 145 μ m and 110 or 115 μ m in diameter, duct introverted shallowly into capsule.

Holotype male, Myohyangsan Mts., 5 km SW of Hyangsan, 4.VIII.1989, M. KOZÁNEK. Paratypes: 8♂13♀, same data as holotype; 1♂, Tokkol Valley, Myohyangsan Mts., 3.VIII.1989; 1♂, Mt. Paekdu, Paekdusan Mts., 16.VIII.1989.

Distribution. North Korea.

Remarks. This species is distinguishable from Chinese *potanini* CZERNY by its short third antennal segment and aristal hairs, and yellow bases of all tibiae.

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References

- COLLIN, J. E., 1948. A short synopsis of the British Sapromyzidae (Diptera). *Trans. R. ent. Soc. Lond.*, **99**: 225–242.
- COQUILLET, D. W., 1898. Report on a collection of Japanese Diptera, presented to the U.S. National Museum by the Imperial University of Tokyo. *Proc. U.S. natl. Mus.*, **21**: 301–340.
- CZERNY, L., 1932. Lauxaniidae (Sapromyzidae). In E. LINDNER (ed.): *Die Fliegen der palaearktischen Region*, **62**: 1–76. Stuttgart.
- , 1935. Die neue Lauxaniiden (Dipt.). *Konowia*, **14**: 268–270.
- FABRICIUS, J. C., 1787. *Mantissa insectorum sistens species nuper detectas*. Vol. 2, 382 pp. Hafniae.
- , 1794. *Entomologia systematica emendata et aucta*. Vol. 4, 472 pp. Hafniae.
- FALLÉN, C. F., 1820. *Ortalides Sveciae*. 34 pp. Lundae.
- HENDEL, F. 1938. *Muscaria holometopa* (Dipt.) aus China in Naturhistorischen Reichsmuseum zu Stockholm. *Arkiv. Zool.*, **30**(3): 1–13.
- KERTÉSZ, K., 1913. H. SAUTER's Formosa-Ausbeute. Lauxaniinae (Dipt.). *Ann. hist.-nat. Mus. natn. hung.*, **13**: 88–102.
- LOEW, H., 1850. Zwei neue Fliegen und zwei systematische Bedenken. *Stettin. ent. Zeit.*, **11**: 378–382.
- MARTINEK, V., 1974. New European species *Lauxania minor* sp. n. and redescription of species *Lauxania cylindricornis* (FABR.) (Diptera, Lauxaniidae). *Biol.*, **29**: 609–617. Bratislava.
- MEIGEN, J. W., 1826. Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten. Vol. 5, 412 pp. Hamm.
- MIK, J., 1887. Ueber Dipteren. *Verhandl. K.-k. zool.-bot. Gesell. Wien*, **37**: 173–188.
- PAPP, L., 1984. Lauxaniidae (Diptera), new Palaearctic species and taxonomical notes. *Acta zool. hung.*, **30**: 159–177.
- REMM, E. and K. ELBERG, 1979. Terminalia of the Lauxaniidae (Diptera) found in Estonia, Latvia and Lithuania. In K. ELBERG (ed.): *Dipteroloogilisi uurimusi*, 66–117. Tartu.
- , 1980. On the Mongolian fauna of Lauxaniidae (Diptera). *Nasek. Mongol.*, **7**: 423–436. (In Russian.)
- SASAKAWA, M., 1985. Japanese Lauxaniidae (Diptera). IV. *Akitu*, n. ser., **73**: 1–8.
- SASAKAWA, M. and S. IKEUCHI, 1982. A revision of the Japanese species of *Homoneura* (*Homoneura*) (Diptera, Lauxaniidae), Part 1. *Kontyû*, Tokyo, **50**: 477–499.
- , 1983. A revision of the Japanese species of *Homoneura* (*Homoneura*) (Diptera, Lauxaniidae), Part 2. *Ibid.*, **51**: 289–297.
- , 1985. A revision of the Japanese species of *Homoneura* (*Homoneura*) (Diptera, Lauxaniidae), Part 3. *Ibid.*, **53**: 491–502.
- SHATALKIN, A. I., 1992. New lauxaniid flies (Diptera, Lauxaniidae) from the Amur Region and the Far East. *Zool. J.*, **71**(9): 79–87. (In Russian.)
- STUCKENBERG, B. R., 1971. A review of the Old World genera of Lauxaniidae (Diptera). *Ann. Natal Mus.*, **20**: 499–610.

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